

# MÚSICA Y COMPUTACIÓN: IDENTIFICACIÓN Y CLASIFICACIÓN DE ACORDES 6-4 USANDO LA LIBRERÍA MUSIC21

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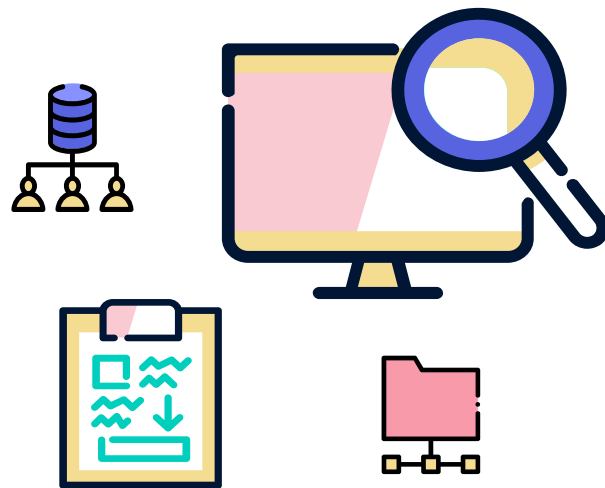
01.

CONTEXTO

MOTIVACIÓN



En la actualidad, el análisis de datos ha adquirido una amplia relevancia en muchas áreas del conocimiento gracias a su capacidad de escrutinio de grandes volúmenes de información





## MÚSICA E INFORMACIÓN

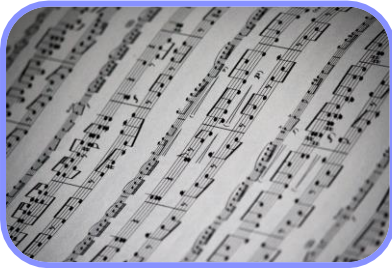


Como se verá a continuación, el análisis de datos, puede aportar significativamente en áreas de la industria musical.

# DIFERENTES FORMATOS

DIGITALIZACIÓN

MIDI



XML

```
Download New M... C:\Users\Papitha... C:\Users\Papitha... C:\Users\Papitha... Agoda.com
<?xml version="1.0" encoding="UTF-8"?>
<DOCUMENT VERSION="10.3" TYPE="RPWIP">
  <DOCSET NAME="form">
    <MOXFILE NAME="slr567"/>
    <GROUP NAME="" NAME2="VERSION 103" NAMEX="Hello">
      <FORM NAME="Copyright - Basic" OPTIONS="R">
        <DESCRIPTION>Copyright - Basic Description Part</DESCRIPTION>
        <FIELD NAME="First">8:20 PM</FIELD>
        <FIELD NAME="Last">6:30PM</FIELD>
        <RECIPIENT NAME="Cust" SEQUENCE="2" CODE="" COPYCOUNT="2"/>
        <RECIPIENT NAME="Head" SEQUENCE="3" CODE="" COPYCOUNT="2"/>
        <RECIPIENT NAME="Democratic" SEQUENCE="4" CODE="" COPYCOUNT="2"/>
      </FORM>
    </GROUP>
  </DOCSET>
</DOCUMENT>
```

CSV



# LO QUE SE QUIERE LOGRAR



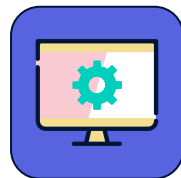
ANÁLISIS MUSICAL



IDENTIFICACIÓN DE PRÁCTICAS ATÍPICAS



ESTADÍSTICA

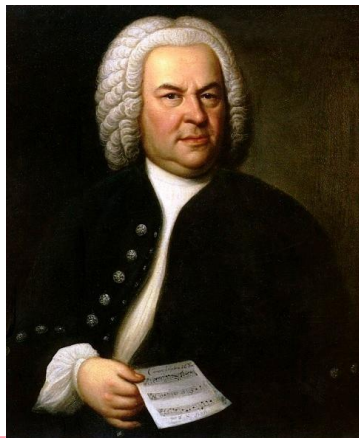


TEORÍA MUSICAL



02

# JUSTIFICACIÓN

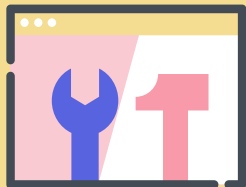


I 6/4 P I<sub>6</sub>



03

# OBJETIVO



Proporcionar herramientas computacionales que faciliten el análisis y la investigación teórica musical.



04

# DESARROLLO DEL PROYECTO



# SOFTWARE JSYMBOLIC

**Information**

**SYMBOLIC FILES TO EXTRACT FEATURES FROM**

File Name	File Path
F164_27_Tromboncino_Quanta_mai_corrJ.mid	C:\Users\Cory\Documents\Pu...
F164_28_Anon_Fraille_infelice_TransJS.mid	C:\Users\Cory\Documents\Pu...
F164_29_Anon_S_il_doi_TriL.mid	C:\Users\Cory\Documents\Pu...
F164_30_Anon_Quel_foco_TriL.mid	C:\Users\Cory\Documents\Pu...
F164_31_Pesenti_S0_san_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_32_Cara_Pesenti_Tromboncino_Quando_lo_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_33_Pesenti_O_Dio_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_34_Isaac_Hora_e_corrJ.mid	C:\Users\Cory\Documents\Pu...
F164_35_Compere_Che_fa_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_36_Tromboncino_Che_debbio_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_37_Dorechi_La_torforella_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_38_Josquin_Scaramella_JRP_corrJ.mid	C:\Users\Cory\Documents\Pu...
F164_39_Anon_Fortuna_disperata_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_40_Anon_Jam_pns_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_41_Anon_Donna_tu_corrJ.mid	C:\Users\Cory\Documents\Pu...
F164_42_PataVino_Donne_venite_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_43_PataVino_Un_cavallei_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_44_Festa_L_ultimo_0_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_45_Anon_Vaghe_ie_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_01_Pisano_Quanto_piu_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_02_Pisano_Si_e_debile_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_03_Pisano_De_perche_OMRcorrL.mid	C:\Users\Cory\Documents\Pu...
F164_04_Pisano_Son_lo_1_OMRcorrL_newVersionJS.mid	C:\Users\Cory\Documents\Pu...

**FEATURES TO SAVE**

Save	Feature Name	Code	Values	MEI-Only
<input checked="" type="checkbox"/>	Basic Pitch Histogram	P-1	128	No
<input checked="" type="checkbox"/>	Pitch Class Histogram	P-2	12	No
<input checked="" type="checkbox"/>	Folded Fifths Pitch Class Histogram	P-3	12	No
<input checked="" type="checkbox"/>	Number of Pitches	P-4	1	No
<input checked="" type="checkbox"/>	Number of Pitch Classes	P-5	1	No
<input checked="" type="checkbox"/>	Number of Common Pitches	P-6	1	No
<input checked="" type="checkbox"/>	Number of Common Pitch Classes	P-7	1	No
<input checked="" type="checkbox"/>	Range	P-8	1	No
<input checked="" type="checkbox"/>	Importance of Bass Register	P-9	1	No
<input checked="" type="checkbox"/>	Importance of Middle Register	P-10	1	No
<input checked="" type="checkbox"/>	Importance of High Register	P-11	1	No
<input checked="" type="checkbox"/>	Dominant Spread	P-12	1	No
<input checked="" type="checkbox"/>	Strong Tonal Centres	P-13	1	No
<input checked="" type="checkbox"/>	Mean Pitch	P-14	1	No
<input checked="" type="checkbox"/>	Mean Pitch Class	P-15	1	No
<input checked="" type="checkbox"/>	Most Common Pitch	P-16	1	No
<input checked="" type="checkbox"/>	Most Common Pitch Class	P-17	1	No
<input checked="" type="checkbox"/>	Prevalence of Most Common Pitch	P-18	1	No
<input checked="" type="checkbox"/>	Prevalence of Most Common Pitch Class	P-19	1	No
<input checked="" type="checkbox"/>	Relative Prevalence of Top Pitches	P-20	1	No
<input checked="" type="checkbox"/>	Relative Prevalence of Top Pitch Classes	P-21	1	No
<input checked="" type="checkbox"/>	Interval Between Most Prevalent Pitches	P-22	1	No
<input checked="" type="checkbox"/>	Interval Between Most Prevalent Pitch Classes	P-23	1	No
<input checked="" type="checkbox"/>	Pitch Variability	P-24	1	No
<input checked="" type="checkbox"/>	Pitch Class Variability	P-25	1	No

**PROCESSING INFORMATION**

SUMMARY INFORMATION ON ALL IMPLEMENTED FEATURES:

- 246 unique features
- 1487 combined feature dimensions
- 228 unique one-dimensional features
- 18 unique multi-dimensional features
- 246 sequential features

Feature breakdown by type:

- 41 unique Overall Pitch Statistics features (190 total dimensions)
- 25 unique Melodic Intervals features (152 total dimensions)
- 35 unique Chords and Vertical Intervals features (183 total dimensions)
- 95 unique Rhythm features (449 total dimensions)

**CONFIGURATION FILE AND WINDOWING SETTINGS**

Load New Settings from a Config File | Save These Settings to a Config File

Extract Features from Entire Files |  Extract Features from Windows

Window Duration (seconds): 0.0

Window Overlap Fraction (0.0 to 1.0): 0.0

**FEATURE EXTRACTION AND SAVING SETTINGS**

Set ACE XML Feature Values Save Path: /extracted\_feature\_values.xml

Set ACE XML Feature Definitions Save Path: /feature\_definitions.xml

Also Save Features in a Weka ARFF File |  Also Save Features in a CSV File

**EXTRACT AND SAVE FEATURES**

# MUSICPY

musicpy 6.91

```
pip install musicpy
```



# MUSIC21

[HTTPS://GITHUB.COM/EBO1703/M\\_C](https://github.com/EBO1703/M_C)

```
#Ejemplo de Lectura  
s = corpus.parse('bach/bwv66.6')  
s.show()
```

bwv66.6.mxl

```
!pip install --upgrade music21  
!add-apt-repository ppa:m_score-ubuntu  
!apt-get update  
!apt-get install musescore  
!apt-get install xvfb
```

*J* = 96

The image displays a musical score for four voices: Soprano, Alto, Tenor, and Bass. The score is in G major (one sharp) and 3/4 time. The tempo is marked as *J* = 96. The Soprano part features a melodic line with a fermata over the second measure. The Alto part provides a harmonic accompaniment. The Tenor and Bass parts provide a steady bass line. The score is presented in a clean, black-and-white format with standard musical notation.



```
In [1]: from clase import cuartas

from clasificacion import *

#Ejemplo coral Bach
bach_path = '../Archivos/Corales/028600B_.xml'
bach = cuartas(bach_path)
df = bach.extraer_df()

#Clasificación
aa = acorde6_4_paso(df)
aa
```

```
/usr/lib/python3/dist-packages/requests/__init__.py:87: RequestsDependencyWarning: urllib3 (2.0.4)
match a supported version!
warnings.warn("urllib3 ({}), or chardet ({}), doesn't match a supported "
```

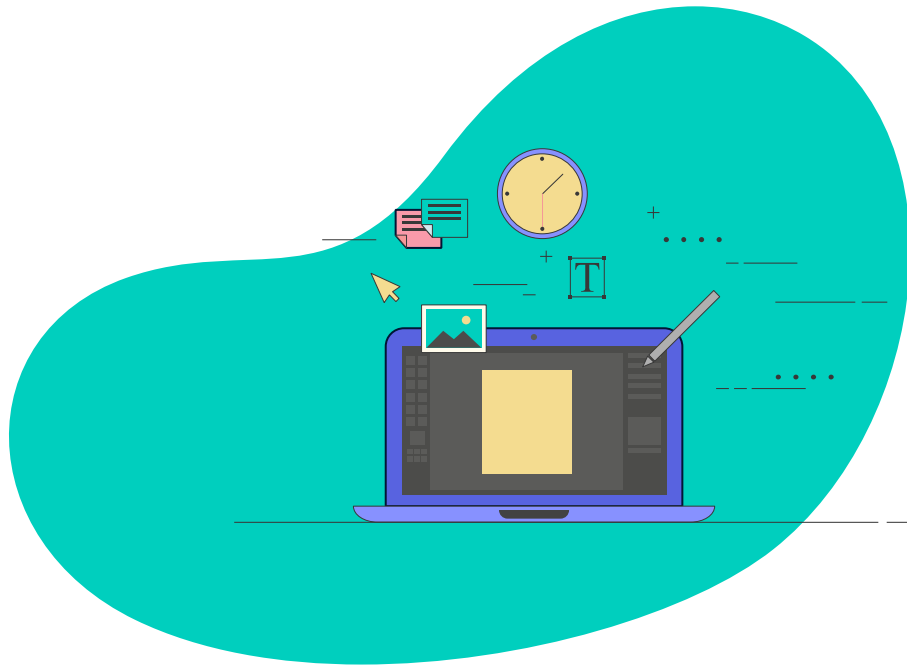
```
Out[1]:
```

	Acordes	Condición1	Condición2	Condición3	Condición4	Suma
10	[D3, B3, G4, E5]	False	False	True	True	2
31	[G3, E4, A4, C5]	False	False	True	False	1
34	[E3, E4, A4, C5]	True	False	True	False	2

05.

ESTADO

ACTUAL



# 371 CORALES

Base de datos en formato XML

Margaret Greentree

<http://sporadic.stanford.edu/Chorales/>





**41366**

Número de acordes  
analizados

**3497**

Acordes identificados  
como 6/4

**368**

Acordes clasificados  
Paso - Cadencial - Bordadura

**3129**

Acordes no  
clasificados



# CLASIFICACIÓN DE LOS ACORDES 6/4

## 6/4 DE PASO

Más precisión

352

## 6/4 CADENCIAL

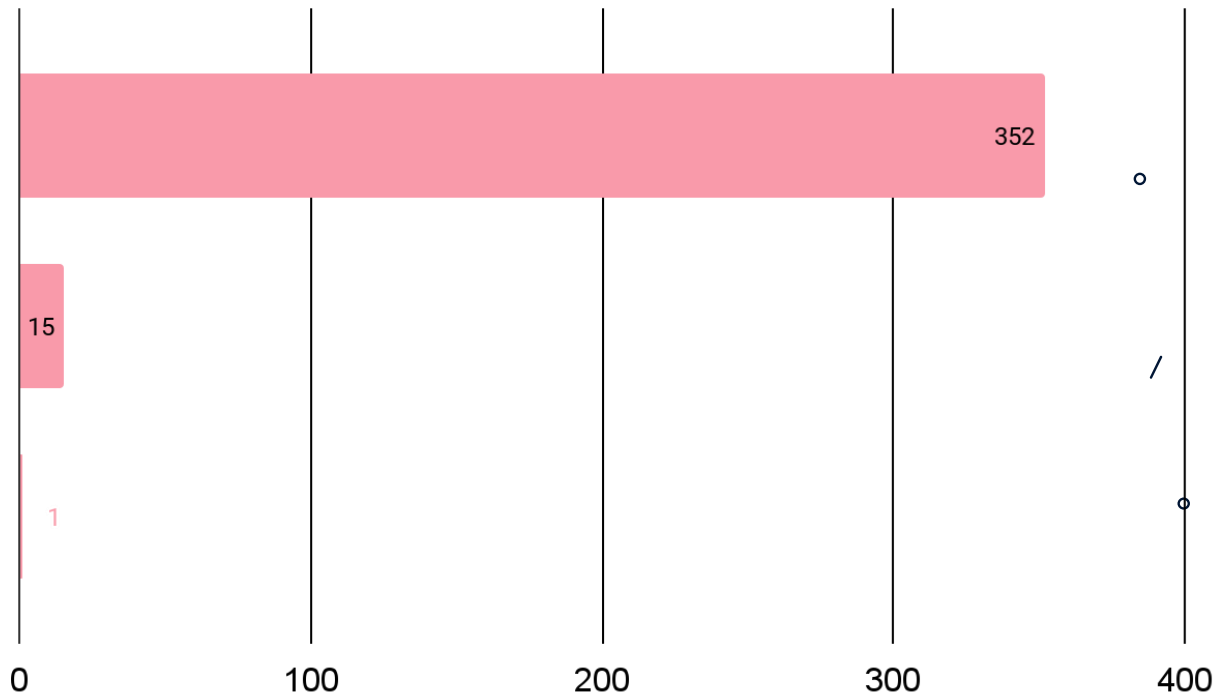
Se lograron identificar varios casos

15

## 6/4 DE BORDADURA

Hay que mejorar el algoritmo

1

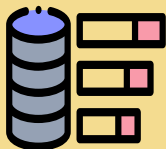
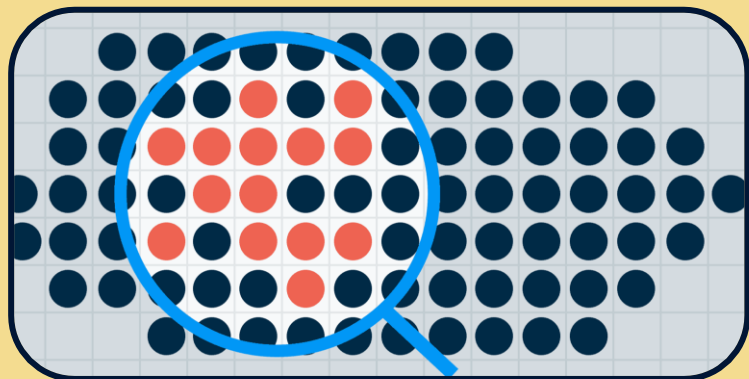


06.

PERSPECTIVAS

FUTURAS





# DESARROLLO DE APLICATIVO

## MEJORAR EL ALGORITMO

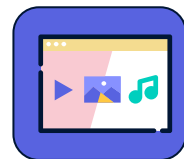
### INCLUIR OTROS ASPECTOS DE LA TEORÍA MUSICAL

Mejorar el algoritmo para lograr identificar los casos que no son 100% canónicos..

# A LARGO PLAZO.



Estadística por  
compositores, épocas.



Utilización de los resultados  
para la generación de  
algoritmos generativos



# GRACIAS!

